CMIME
Center for Materials at Irradiation and Mechanical Extremes

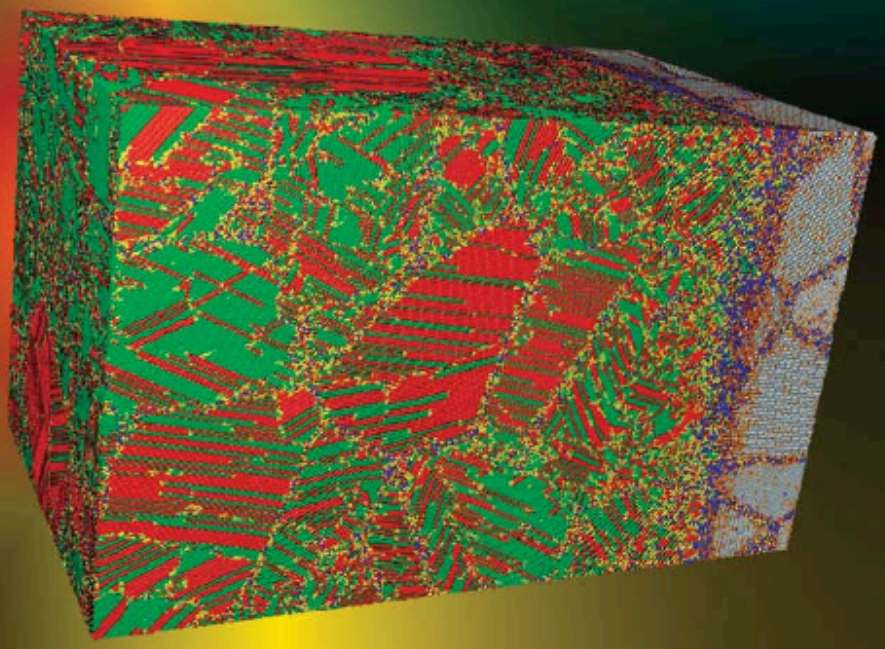
Inside: Energy Quarterly EQ

December 2010 Vol. 35 No. 12
www.mrs.org/bulletin

MRS Bulletin

MRS MATERIALS RESEARCH SOCIETY
Advancing materials. Improving the quality of life.

Structural metals at extremes



ALSO IN THIS ISSUE

Materials for organic and hybrid inorganic/ organic electronics

CMIME
Center for Materials at Irradiation and Mechanical Extremes

BES update: ***MRS Bulletin*** **theme issue "*Structural Metals at Extremes*" highlights work from LANL's new EFRC**

The cover image of the December issue of *MRS Bulletin* is from the work of **Tim Germann (LANL)** and collaborators on the MD simulation of shock response of nanocrystalline metals. Germann leads the high strain rate deformation team in the Center for Materials at Irradiation and Mechanical Extremes (CMIME), an Energy Frontier Research Center (EFRC) sponsored by DOE, Office of Science, Office of Basic Energy Sciences.

Michael Demkowicz (MIT) leads the metals irradiation team in the Center for Materials at Irradiation and Mechanical Extremes (CMIME), along with **Pascal Bellon** (UIUC) a member of the high strain deformation team in CMIME wrote an article in the issue on "Atomic-scale design of radiation-tolerant nanocomposites"

Amit Misra, CMIME co-director, served as the ***guest editor*** of this special issue that overviews work in the emerging area of prediction and control of material response at extreme conditions of irradiation, shock, plastic deformation, temperature, etc. The set of invited overview articles in this issue describe c:\documents and settings\100051\eudora\attach\MRSBull.pdf "top-down" and "bottom-up" synthesis methods to create nanostructured metals and composites that contain atomically designed interfaces that not only block dislocation slip but also attract, absorb, and annihilate point and line defects. These articles also highlight the critical role of multi-scale materials modeling and integration of modeling with experiments to understand the underlying physics at the fundamental level. Such multifunctional material systems are not just high in strength but also tolerant of damage at extremes of irradiation, temperature, and mechanical stresses, and hence have applications as structural materials in nuclear power and other energy, transportation and defense technologies. The exploration of these exceptional properties at extremes requires novel and unconventional methodologies, such as *in situ* experiments with high spatial and temporal resolution, complemented by simulation across multiple length and time scales.

In addition to guest editing this theme issue, **Amit Misra** served as a **2009 Volume Organizer** and was recently appointed a permanent member of the **Editorial Board** of *MRS Bulletin**.

**MRS Bulletin* (2009 impact factor = 6.33) is one of the most widely recognized and highly respected publications in advanced materials research. Published monthly by the Materials Research Society (MRS), it features technical theme topics that capture a snapshot of the state-of-the-art of material research. Written by leading experts, the overview articles are useful references for specialists but are also presented at a level understandable to a broad scientific audience.